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(71)(72) Applicant and Inventor: CHO, Byoung, Min [KR/KR]; 753-15, Mok 4-Dong, Yang Cheon-Ku, Seoul 158-050 (KR).

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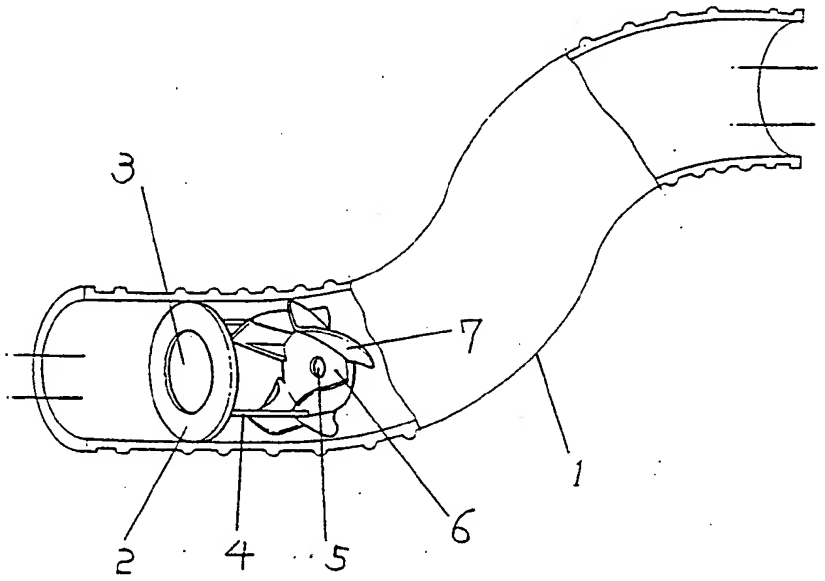
(54) Title: AIR WHIRLPOOL GENERATOR FOR AN INTERNAL COMBUSTION ENGINE

(57) Abstract

In a background art using the air whirlpool generation technologies, there was a turbulence chamber (whirlpool chamber type) engine in the past and at present, a further developed DOHC engine having the type of horizontal whirlpool generation within a cylinder. Further, it is known scientifically that effects for improvement in performances of the engines, saving of energy, reduction of smoke pollution and reduction of engine noise were obtained by mounting the air whirlpool generator on the internal combustion engine using various fuels including gasoline, diesel oil, liquified petroleum gas, alcohol, hydrogen gas, etc. The present invention has the benefits that with an outer structure of a radial wing (7) generating whirlpool of the centrifugal force and with an inner structure composed of a central air separation plate (6) having a cyclone aperture (5) of predetermined diameter, generating the whirlpool of the centripetal force, air flowing at high speed is instantaneously separated and the whirlpool of the centripetal force with a high-speed cyclone center is obtained so as to improve the combustion performances of the engines.



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AIR WHIRLPOOL GENERATOR FOR AN INTERNAL COMBUSTION ENGINE

TECHNICAL FIELD

The present invention relates to an air whirlpool generator for an air-suction hose and an exhaust pipe of an internal combustion engine. More particularly, the present invention relates to improvements in combustion performances of various engines using the air whirlpool generation technologies, in which air-fuel mixture and combustion reaction are improved by mounting on the air-suction hose the air whirlpool generator having the same condition as that of the existing direction of the air whirlpool generation designed in an air-cleaner box of the internal combustion engine, and the exhaust gas is discharged at high speed by mounting the equal type of air whirlpool generator on the exhaust passage from the engine.

BACKGROUND ART

In a background art using the air whirlpool generation technologies, there was a turbulence chamber(whirlpool chamber type) engine in the past and at present, a further developed DOHC engine having the type of horizontal whirlpool generation within a cylinder.

Also, it is known and disclosed in several patents to provide a variety of air whirlpool generator on air-suction port such as air-cleaner, carburetor or suction pipe and on air exhausting port, of various internal combustion engines and an automobile engine so as to improve performances of the engines. Such patents as are known in the art are U.S. Patent No. 2,017,043, U.S.

Patent No. 3,877,907 and U.S. Patent No. 4,962,642, Japanese Patent Publication No. 58-13122, Korean Utility Model Publication No. 76-1369, and Korean Patent No. 411,425, and the technologies disclosed in the patents are being actually used in the various combustion engines and the automobile engine.

Further, it is known scientifically that effects for improvement in the performances of the engines, saving of energy, reduction of smoke pollution and reduction of engine noise were obtained by mounting the air whirlpool generator on the combustion engine using various fuels including gasoline, diesel oil, liquefied petroleum gas, alcohol, hydrogen gas, etc.

DISCLOSURE OF INVENTION

It is known in several patents that combustion performances of the engines were improved by using the air whirlpool generator mounted on the air-suction port of the air passing through an air filter and the air-exhausting port, of the various combustion engines.

There are "+" type of whirlpool generator, propeller type of whirlpool generator, radial fan type of whirlpool generator, spiral pipe type of whirlpool generator and the whirlpool generator using a radial plate.

The air whirlpool generator according to the present invention is different from that of the prior patents and known technologies and the present invention has the benefits that with an outer structure of a radial wing generating whirlpool of the centrifugal force and with an inner structure composed of a central air separation plate

having a cyclone aperture of predetermined diameter, generating the whirlpool of the centripetal force, air flowing at high speed is instantaneously separated and the whirlpool of the centripetal force with a high-speed cyclone center is obtained so as to improve the combustion performances of the engines.

Namely, the present invention is a technology of generating the air whirlpool by obtaining the centripetal force with a high-speed cyclone center by fixedly mounting the air whirlpool generator on the air-suction port of the air passing through an air filter or the air- suction hose and the exhaust pipe or a tail pipe of muffler, respectively. The present invention is characterized in that it has the structure for generating the centrifugal whirlpool of radial wings 7 increasing at the first stage instantaneous speed of a running fluid by mounting a circular ring type of an orifice 2 for the purposes of Venturi effects adequate to a pipe 1 in which high-speed air flows, connected with a fixing support pin 4 maintaining regular intervals from such orifice, and the structure for generating the whirlpool, composed of the structure for generating the whirlpool of the centripetal force having a central air separation plate 6 with a cyclone aperture 5 of predetermined diameter. The present invention is also characterized in that with the construction mentioned above, effects of discharging the whirlpool of the centripetal force with the cyclone center at high speed are obtained by instantaneously separating the air flowing at high speed into the centrifugal

whirlpool and the centripetal whirlpool.

Such principle is equal to the principle of firing a ball cartridge with the high-speed whirlpool from M16 barrel, and in the principle, effects of discharging centripetal whirlpool with the cyclone center were utilized in generating the air whirlpool of the air-suction hose of the engines. By mounting the air whirlpool generator on the air-suction hose of each internal combustion engine, mixture rate between the air and the fuel including gasoline, diesel oil, liquefied petroleum gas, alcohol, hydrogen gas, etc., is increased and the combustion reaction rate is improved so that output energy (applying the principle of $E = M C^2$) of various engines is increased. In the same manner as mentioned above, by mounting the air whirlpool generator on the exhaust hose such as exhaust pipe or tail pipe of muffler, the exhaust gas is discharged at high speed to improve the combustion performances of the engines.

The air whirlpool generator according to the present invention is a technology conceived with the application of the whirlpool of the centripetal force having the strong cyclone center to achieve the effects for improvements in the engines performances, energy saving, reduction of smoke pollution, improvements in incomplete combustion and reduction of the engine noise.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view of an air whirlpool generator for an internal combustion engine according to the present invention.

Fig. 2 is a bottom perspective view of the air whirlpool generator according to the present invention.

Fig. 3 is a reference view showing the air whirlpool generator in use.

Fig. 4 is a top view of the air whirlpool generator according to the present invention.

Fig. 5 is a bottom view of the air whirlpool generator according to the present invention.

Fig. 6 is a front elevational view of the air whirlpool generator according to the present invention, and is a rear elevational view thereof, which is symmetrical.

Fig. 7 is a right-side elevational view of the air whirlpool generator according to the present invention, and is a left-side elevational view thereof, which is symmetrical.

Fig. 8 is a view taken on line A-A of Fig. 6.

BEST MODE FOR CARRYING OUT THE INVENTION

As a method for mounting an air whirlpool generator according to the present invention on both sides of air-suction hose and exhaust pipe or tail pipe of muffler, the air whirlpool generator according to the present invention is mounted firstly at an air passage passing through an air filter to improve combustion performances of an internal combustion engine using various fuels and to obtain the effects for reduction of smoke pollution and for energy saving, and the air whirlpool generator according to the present invention is mounted on the exhaust pipe so that the exhaust gas can be discharged at

high speed. Such improvements in the engine performances will lead to energy saving and reduction of smoke pollution.

INDUSTRIAL APPLICABILITY

An air whirlpool generator according to the present invention can be applied to any air-suction port and air-exhausting port of various internal combustion engines using gasoline, diesel oil, liquefied petroleum gas, alcohol, hydrogen gas and other gas. The air whirlpool generator is used mostly for improvement in combustion performances of engines, energy saving and reduction of smoke pollution. For manufacturing the product according to the present invention, composite materials including metal, ceramic, reinforced plastic, etc., can be used.

CLAIMS

1. An air whirlpool generator for an internal combustion engine which was fixedly mounted on an air-suction port including an air-suction hose and an exhaust pipe or tail pipe of muffler, wherein said air whirlpool generator comprising;

an outer structure having a plurality of radial wings for generating whirlpool of centrifugal force connected fixedly with a fixing support pin 4 maintaining predetermined intervals on an orifice 2 having an air aperture 3 for increasing instantaneous speed of a running fluid for Venturi effects adequate to the diameter of said air-suction hose or pipe 1, and

an inner structure having a cyclone aperture 5 of predetermined diameter on an air separation plate 6 in a center portion for generating whirlpool of the centripetal force.

FIG.1

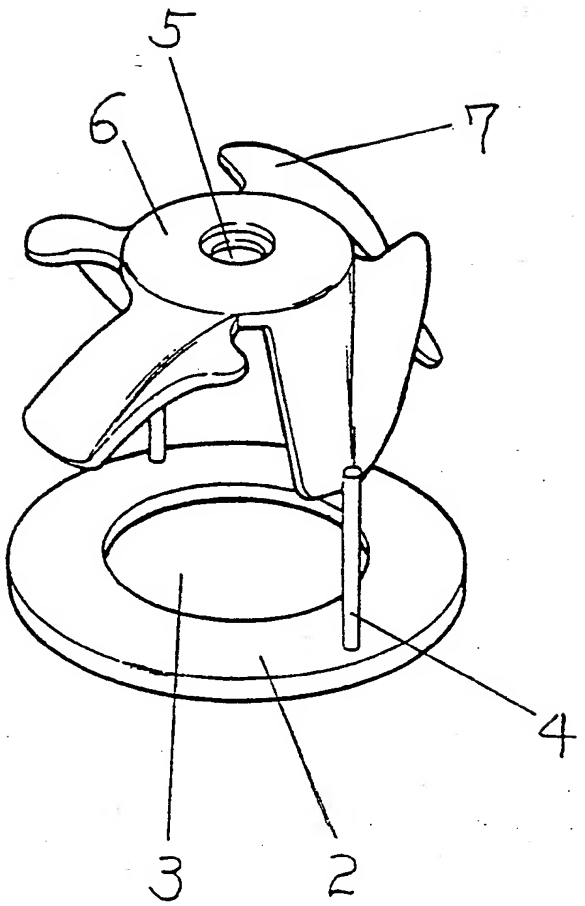


FIG.2

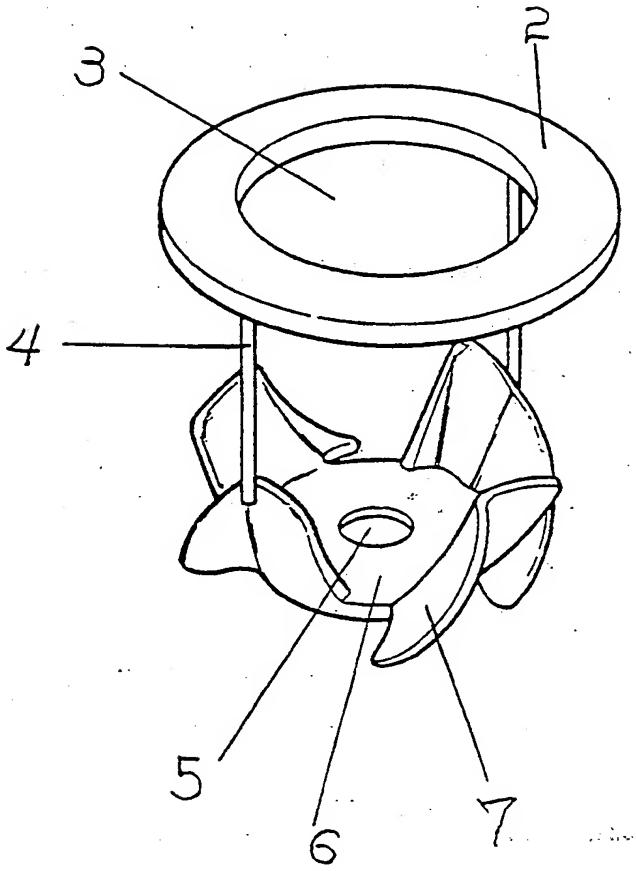


FIG.3

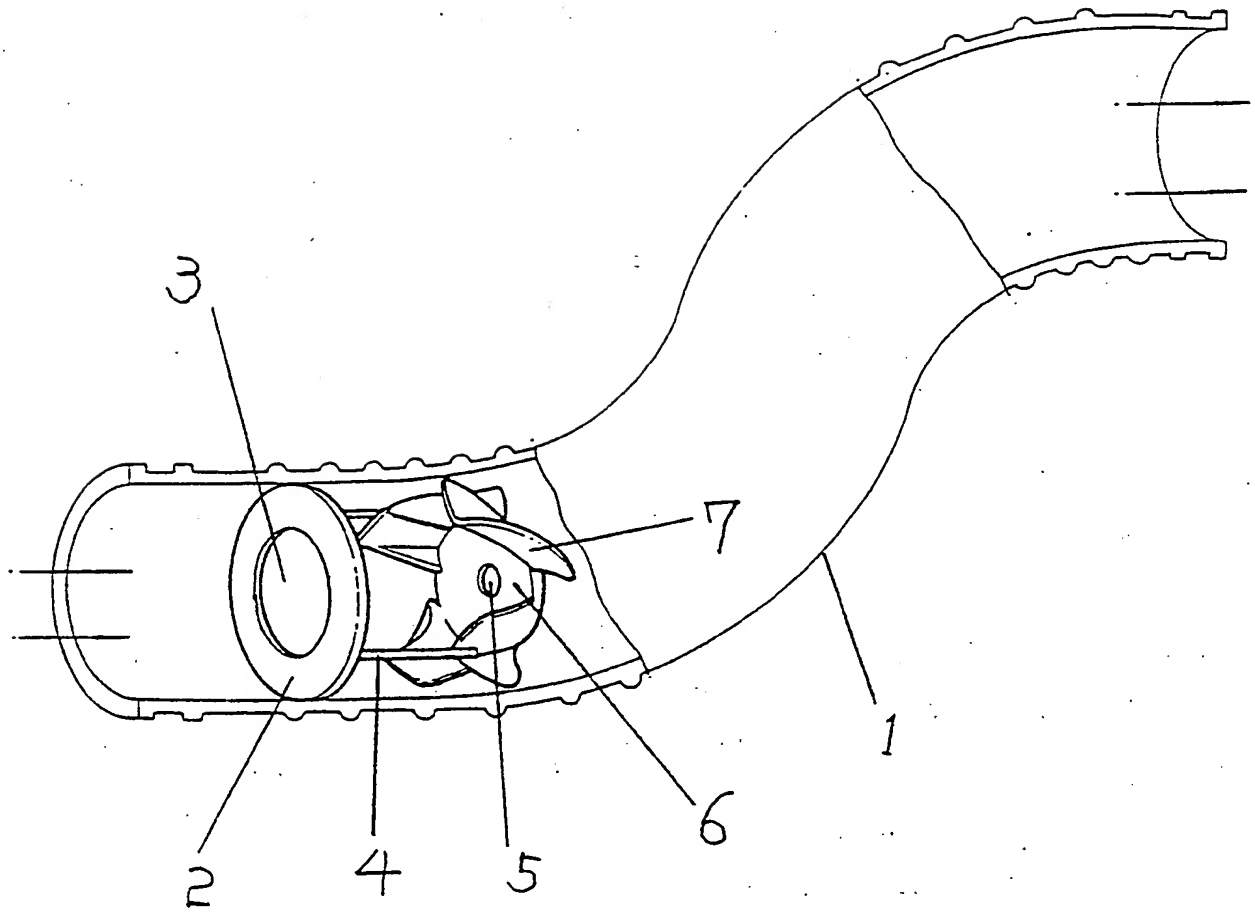


FIG. 4

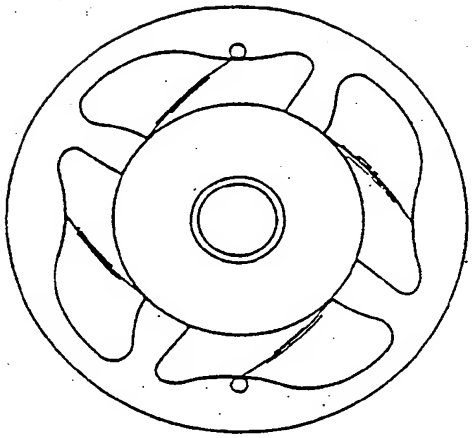


FIG. 5

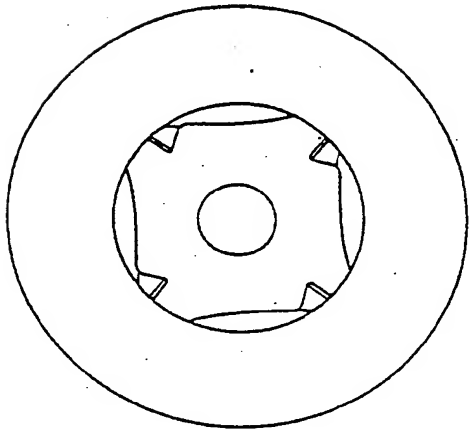


FIG.6

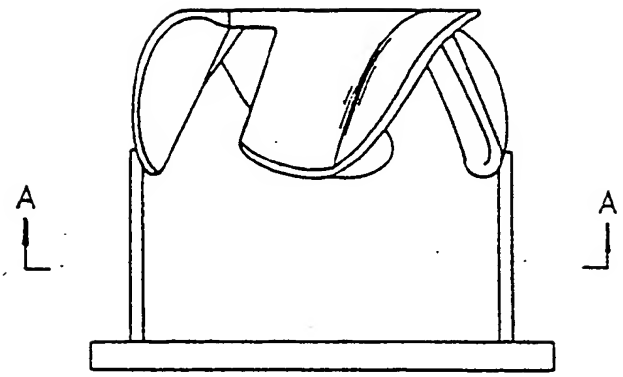


FIG.7

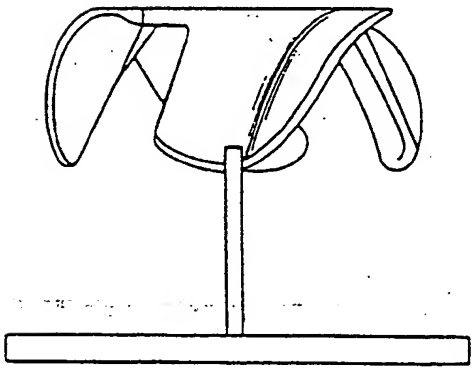
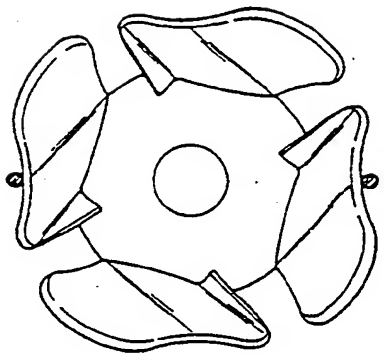


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 93/00060

A. CLASSIFICATION OF SUBJECT MATTER

IPC[5]: F 02 M 29/06; F 01 N 7/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[5]: F 02 M 29/04, 29/06, 35/10; F 01 N 1/12, 5/04, 7/08; F 02 B 27/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 3 938 967 (REISSMÜLLER) 17 February 1976 (17.02.76), totality.	1
A	GB, A, 645 812 (THOMPSON, FREEMAN) 08 November 1950 (08.11.50), totality.	1
A	CH, A, 284 184 (KUHN) 01 November 1952 (01.11.52), totality.	1
A	DE, A1, 2 706 892 (FORD-WERKE AG) 25 August 1977 (25.08.77), totality.	1
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Date of the actual completion of the international search	Date of mailing of the international search report
24 November 1993 (24.11.93)	02 December 1993 (02.12.93)

Name and mailing address of the ISA/AT	Authorized officer
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US A 3938967	17-02-76	AT A 834/75	15-01-76
		AT B 332682	11-10-76
		BR A 7501381	30-11-76
		CA A1 1016826	06-09-77
		CH A 577113	30-06-76
		DD C 117265	05-01-76
		DE A1 2510677	02-10-75
		DE B2 2510677	29-05-80
		DE C3 2510677	16-04-81
		DK A 1289/75	30-09-75
		DK B 139394	12-02-79
		DK C 139394	23-07-79
		ES A1 436038	01-01-77
		FI A 750818	30-09-75
		FR A1 2265997	24-10-75
		GB A 1496040	21-12-77
		HU P 171821	28-03-78
		IL A0 46868	22-05-75
		IL A1 46868	31-08-77
		IT A 1033363	10-07-79
		JP A2 50130926	16-10-75
		JP B4 55017229	09-05-80
		NL A 7502065	01-10-75
		NO A 750607	30-09-75
		SE A 7502064	30-09-75
		SE B 400349	20-03-78
		SE C 400349	29-06-78
		YU A 392/75	30-04-81
		YU B 36062	13-11-81
		ZA A 7500377	28-01-76
GB A 645812		keine - none - rien	
CH A 284184		keine - none - rien	
DE A1 2706892	25-08-77	AU A1 22059/77	17-08-78
		AU B2 511072	24-07-80
		CA A1 1060735	21-08-79
		DE C2 2706892	11-10-84
		ES A1 456130	01-02-78
		ES A5 456130	28-02-78
		FR A1 2341748	16-09-77
		FR B1 2341748	18-06-82
		GB A 1568845	04-06-80
		JP A2 52102936	29-08-77
		US A 4094291	13-06-78
US A 4222456	16-09-80	JP A2 53132633	18-11-78